NOTE XXXIV.

CONTRIBUTIONS TOWARDS THE KNOWLEDGE OF THE ANNELIDA POLYCHAETA.

BY

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III [1]).

On species of *Nereis*, belonging to the sub-genus *Perinereis*. (Plate 7 and 8).

The sub-genus *Perinereis*, according to Grube's views, contains all *Nereis*-species, characterized by having the lateral dorsal paragnathi of the basal ring of the proboscis (group VI) all or some of them transverse, ridge-shaped, the remaining paragnathi being conical, or pin-shaped (»pectiniformes" Kinberg), or compressed; the feet all of the same structure, or those of the posterior region of the body more enlarged. This division mainly corresponds to Kinberg's family Aretidea, and not to his genus *Perinereis*, containing the species, which have no pectiniform teeth and but little modified posterior feet. However it seems preferable to me to maintain Kinberg's name, as I do not like to increase the systematical literature with a new one, and because the greatest number of species of the family Aretidea are united in the genus *Perinereis*, the four other genera (*Arete*, *Pseudonereis*, *Paranereis* and *Naumachius*) containing only a small part of them. To use the name *Lipephile*, afterwards proposed by Malmgren for *N. cultrifera*. instead of *Perinereis*, as done by Claparède a. o., seems not justified to me, because the name *Perinereis* has the priority, and moreover the name *Lipephile* is applied

1) For Part I see Vol. VIII, p. 157, and for Part II Vol. XI, p. 37.

by Claparède in a sense different from what it was intended for by its author.

I prefer to base the subdivisions of the genus *Nereis* rather on characters taken from the arrangement of the paragnathi, than on the state of development of the dorsal lobe of the feet. The main groups of paragnathi of the proboscis are rather constant and appear not to be liable to much variation in the same species; moreover the knowledge of their arrangement enables us to recognize also the systematical position of the *Heteronereis*-forms. On the contrary the lobes of the feet are liable to much variation in different regions of the body, and show such marked changes in individuals coming to sexual maturity, that I do not think it advisable to rely much upon their characters for classification.

Besides the specimens of our Museum, I could also examine the Annelida collected by Prof. E. van Beneden, during his stay on the coast of Brasil, in the Gulf of Rio de Janeiro, and already described by Dr. Armauer Hansen [1]); I am much obliged to the Director of the Museum of Liège for allowing me to examine them, as Hansen's descriptions are as well very incomplete as inaccurate and our knowledge of local faunas being rather scanty. This interesting collection contains two species belonging to the group *Perinereis*, *N. ferox* Hans. and *N. minor* Hans.; in the present note I will publish a detailed description of them. Three other species: *N. obscura* Hans., *N. coerulea* Hans. and *N. microphthalma* Hans., will be shown to be mere synonyms.

Nereis cultrifera Gr. [2]) — Ehlers, Borstenwürmer, p. 461, pl. XXI, figs. 31—36. — Claparède, Annélides

1) Mém. couronnés et Mém. des Savants étrangers de l'Académie Royale de Bruxelles, T. XLIV, 1882, pl. I—VII.

2) For the synonymy it may be referred to those authors, who already published a list of them; I think it superfluous to repeat them and I wish to avoid a common fault of our days, rightly characterized by Bütschli as „eine Art Kultus mit möglichst nummerreichen Literaturverzeichnissen".

chétopodes du Golfe de Naples, Supplément, p. 439, pl. VII, fig. 1.

I examined three specimens from Napels and one individual from the coast of Portugal (Villa Nova de Milfontes), collected by Prof. M. P. d'Oliveira.

The last worm measures 10 cm. in length, while the number of its segments amounts to 102. In group I. its proboscis has two paragnathi, a large tooth preceded by a smaller one, whereas in the Napels specimens there occurs only a single tooth. Our individuals do not agree in all regards with Ehlers' description; f. i. the anal cirri are much longer than indicated by Ehlers, reaching as far as the posterior 11 segments; the tentacular cirri are also longer. According to Ehlers' description they should reach the 5th ring, whereas in our specimens they reach the 7th and 9th segment. In the structure of its feet the Portuguese worm differs somewhat from the Napels specimens, and agrees better with the figures of Audouin and M. Edwards [1]), than with those of Ehlers; the inferior ligule is longer, and extends somewhat beyond the tip of the ventral setigerous lobe. As first was demonstrated by Claparède, and afterwards confirmed by Langerhans [2]), there occur in the inferior fascicle of the ventral lobe some heterogomph setose bristles.

Nereis macropus Clap. (Pl. 7, fig. 12). — Claparède, loc. cit. Supplément, p. 444, pl. VIII, fig. 1.

As far as I know, only the atocous form of this species was observed by Claparède. In our collection I met with two female specimens in epitocous condition, labelled »Méditerranée, Cuvier". Only one specimen is complete; it measures 62 mm. in length and has 104 segments. The

1) Ann. Sc. nat. 1e Sér. T. 27, pl. XIII, figs. 4—6; Règne animal, pl. XII, figs. 1d and 1e.

2) Die Wurmfauna Madera's: Zeitschr. f. Wissensch. Zoologie. Bd. XXXIII, p. 289.

arrangement of the paragnathi quite agrees with Claparède's description and figure. As in other epitocous forms the eyes are very large; the tentacular cirri appear to be somewhat longer than indicated by Claparède, at least the longest of the superior pair of them extends rather far beyond the tip of the palpi, and reversed they reach the 5th segment. The ligules of the anterior feet are not so acute as figured by Claparède, but have a more obtuse tip. Only homogomph setose bristles are present.

At the 20th segment commences the remarkable change in regard to the structure of the feet. The superior ligule has its base greatly enlarged and bears near the origin of the dorsal cirrus an oblong oval lamella; moreover a small narrow lamella occurs at its ventral side. The anterior lip of the dorsal setigerous lobe is largely produced and bears near its base at the ventral side a small oval lamella. The inferior lobe is furnished with a large lamella, at the dorsal side extending along its total length, at the ventral side embracing only its distal end. The inferior ligule is faintly curved in a hook-like manner, with an obtuse papilla near its base. The ventral cirrus is provided at its superior margin with two small tongue-shaped lamellae, at its inferior border with an oblong oval one. At one third of the length of the body the superior ligule of the feet commences to elongate gradually, attaining posteriorly that considerable size, which is described and figured by Claparède; at the same time the lamelliform processes of the feet decrease, first those of the dorsal ligule, then those of the setigerous lobes and finally those of the ventral cirrus. Carus [1]) seems to have been mistaken in placing this species in Ehlers' group I: »Lingula superior simplex, non foliacea, cirrum dorsalem non gerens."

Nereis Oliveirae, n. sp. (Pl. 7, figs. 1—5).

Length of the body 8—10 cm., its breadth at the widest

1) Prodromus Faunae mediterraneae, p. 218.

region 5 mm.; the number of its segments amounts to 124. The epitocous form measures 9 mm. in breadth. A dark brown patch on the dorsum of each foot, usually also a transverse stripe on each side of the segment; ventral side of the foot marbled with blackish. Cephalic lobe longer than broad, antennae subulate, hardly as long as half the length of the head; palpi large, projecting far beyond the antennae. The antero-posterior diameter of the buccal segment about one and a half the length of that of the succeeding one; tentacular cirri short, the inferior pair of them shorter than the palpi, the longest of the superior pair projecting a little beyond the tip of the palpi, reversed they reach the 3rd or 5th ring. The anal cirri, situated at the ventral side, as long as the posterior six segments. The feet in front and posteriorly not quite similar. In the anterior feet the lip of the dorsal setigerous lobe bluntly conical, the lips of the ventral lobe very short, not projecting; the superior ligule of the same structure and length as the dorsal lobe, the inferior ligule a little shorter; dorsal cirrus not extending beyond the tip of the superior ligule, ventral cirrus reaching to the middle of the inferior ligule. In the posterior body-region the superior ligule of the feet is considerably enlarged, consisting of a large lamella, which bears near its tip the small dorsal cirrus; the conical lip of the dorsal lobe reaches only to about the middle of its ventral border; the lips of the ventral lobe are more projecting than in the anterior segments, nearly as far as the inferior ligule.

In the dorsal lobe there occur only homogomph setose bristles; in the ventral lobe the superior fascicle contains homogomph setose bristles and heterogomph falcate ones, but in the inferior fascicle the setose bristles are wanting.

In the epitocous form the anterior 19 segments do not show any change.

Paragnathi of proboscis: Maxillary region, I. two teeth behind each other; II. small triangular group; IV. large semilunar group; III. large group, consisting of a large transverse patch in the middle and a smaller patch of 3 or

4 teeth on each side; basal region, V. a single conical point; VI. one long, ridge-shaped tooth, situated more in front; VII. and VIII. a belt of two irregular rows. — Coast of Portugal.

Of this species I examined five examples, three atocous and two epitocous females; they were collected by Prof. M. P. d'Oliveira near Buarcos, la Granja and Sines. The epitocous forms differ from the other ones by their large dimensions; unfortunately these specimens are incomplete, one of them wanting the posterior body-region, whereas in the other worm this region is partly regenerated. At the 20th segment the change of the feet occurs. The superior ligule is greatly elongated, conical and bears near the base of the dorsal cirrus an oblong oval lamella, at its ventral side a small rounded one; the dorsal cirrus projects somewhat beyond the tip of the ligule. The lip of the dorsal setigerous lobe, enlarged and elongated in the same manner as the ligule, is provided at the base of its ventral side with a small oval lamella. The ventral lobe is cylindrically produced and furnished with a large lamella, which is a little emarginated on the ventral side. The inferior ligule is about of the same length as the ventral lobe, faintly curved and provided with a conical process behind the middle of the superior border. The ventral cirrus reaches nearly to the tip of the inferior ligule, bearing near its base on the dorsal side two small tongue-shaped lamellae and on the ventral side a large oblong oval one. Bristles with knife-shaped terminal pieces occur in both lobes of the feet.

In some specimens the transverse paragnathi of group VI. show curious variations. For, whereas each paragnathe consists in its normal state of a long, narrow ridge, slightly notched in its middle, I found in one atocous specimen the left ridge broken up in four, the right one in three short transverse teeth; in the middle between both rows a small conical tooth was situated, and behind the right row a large Λ-shaped tooth. The unpaired paragnathe of group V. has its normal situation. In examining the proboscis of the

large epitocous examples it becomes obvious, that by the lack of the chitinous investment the long ridges are broken up in some irregular pieces. It may be concluded from this case, how difficult it is to recognize the real arrangement of the paragnathi, when having only a single specimen at his disposal. Though these individuals show great resemblance to *N. floridana* Ehl. [1]) and *N. atlantica* M'Int. [2]), I hesitated to identify them with one of those species. In *N. floridana* the lateral patches of paragnathi in group III. seem to be absent, and the tentacular cirri are also much longer, reaching to the 11th segment; according to Langerhans' description [3]), who examined this species at the coast of Madera, it should have »Gestalt und Vertheilung der Borsten" like in *N. cultrifera*, whereas in our specimens there occur no heterogomph setose bristles in the ventral lobe. *N. atlantica* also wants the lateral paragnathi of group III; moreover in this species the posterior feet seem to have the dorsal setigerous lobe (»second lobe" Mac Intosh) larger than the superior ligule (»superior lobe" Mac Intosh), quite opposite to our specimens.

Nereis malayana, n. sp. (Plate 8, figs. 4—7).

Epitocous form. The largest specimen 9 cm. in length, and 6.5 mm. in breadth at its widest part; the number of segments amounts to 150 or 160. Cephalic lobe about as long as broad; antennae half as long as the head. Palpi with a small terminal boss, their basal part with an annular notch; they are about twice as long as the antennae. The antero-posterior diameter of the buccal ring only a little longer than that of the succeeding segment; all tentacular cirri longer than the palpi, the longest of them reaching to the 6th segment or farther backward. The change of the feet commences in the ♂ at the 21st seg-

1) Borstenwürmer, p. 503.

2) Challenger Reports, Zoology, Vol. XII, Annelida Polychaeta, p. 219, pl. XXXV, figs. 1—3; pl. XVI A, figs. 10 and 11.

3) loc. cit. p. 289.

ment, in the ♀ at the 23rd segment. In the anterior body-region the lip of the dorsal setigerous lobe obtusely conical, longer than the lips of the ventral lobe, which measure about a third of its length. The ligules have the same shape as the dorsal lobe, the superior of them is a little longer, the inferior about of the same length. Dorsal cirrus extending somewhat beyond the tip of the superior ligule, ventral cirrus reaching to the middle of the inferior ligule. In the anterior feet both cirri show a lamellar enlargement of their basal portion. In the inferior fascicle of the ventral lobe there occur, besides the heterogomph falcate bristles, a couple of heterogomph setose ones. In the feet of the middle body-region the lip of the dorsal lobe is considerably produced, with an oblong oval lamella at its base; the ventral lobe has a cordiform anterior lip and a large, round, lamellar posterior one. The superior ligule, extending a little beyond the tip of the dorsal lobe, bears near the base of the cirrus a rather large, oblong, oval lamella; the inferior ligule, not reaching to the distal end of the ventral lobe, is furnished with a conical process near its base. The dorsal cirrus is longer than the superior ligule, smooth in the females, in the males provided with papillae on its distal half. The ventral cirrus longer than the inferior ligule, with an oblong, rhomboidal lamella near the base of its ventral border and two long, narrow, tongue-shaped lamellae at the dorsal edge.

Bristles with knife-shaped terminal pieces of ordinary appearance occur in both lobes. The anal segment shows longitudinal grooves; the anal cirri as long as the posterior 10 segments.

Paragnathi of proboscis: Maxillary region, I. two conical teeth behind each other; II. small triangular patch; IV. larger semilunar group; III. group consisting of a large transverse patch in the middle and a lateral one of 2 or 3 teeth on each side; basal region, V. triangular group of 3 paragnathi; VI. short transverse ridge, slightly notched in its middle; VII. and VIII. a belt of three rows. — Malayan Archipelago, Hoedt.

In a bottle containing Annelida, probably dredged with the tow-net in the Malayan Archipelago by Mr. Hoedt, I found several examples of this *Nereis*-species. Except one specimen they are all incomplete, the anal region being wanting or only partly regenerated. The males appear not to be smaller than the females. Almost all individuals are marked by two parallel, transverse, black stripes on the dorsum of the feet, most distinct in the posterior body-region. The length of the tentacular cirri seems rather variable, for, in one specimen the longest of them reaches to the 5th segment, and in another one to the 8th ring. Though in the males the epitocous transformation of the feet commences at the 21st segment, we find already marks of it at the 20th segment, which shows small lamellae at the base of the dorsal and ventral cirri. In the females the change of the feet commences at the 23rd segment, but faint marks of it are already visible at the two preceding segments. There are also some differences between the feet of the anterior segments in the males and females. In this body-region the dorsal and ventral cirri are gibbous at the base, their distal end being very slender; in the males the anterior 7 feet show this character, in the females it is only observed at six of them. As in other *Heteronereis*-forms the dorsal cirrus of the males in the posterior body-region is provided with papillae along its ventral border; but in the vicinity of the anal end this character disappears, as is already observed by Ehlers in epitocous examples of *N. Dumerilii*. In our specimens this change occurs at the 60th segment; here the dorsal cirri have lost their papillae and show the appearance of those of the females. The dorsal cirri of this body-region show a curious abnormity in both sexes: they are in several segments considerably elongated and extend far beyond the tip of the superior ligule. This abnormal elongation of the dorsal cirrus occurs very irregularly, for often it is present at the left foot of a segment and wants at its right side. Such dorsal cirri of different length are also observed by Grube in some *Syllis*-species.

A considerable change in the shape of the feet may be observed in the posterior body-region, as not only the lamellar processes gradually diminish in size, but also the setigerous lobes presenting different appearance. The dorsal lobe becomes broad and blunt, the ventral lobe on the contrary is conically produced. The anal segment is without feet, cylindrical and its surface is longitudinally grooved; between these grooves there arise ridges of the skin, provided along their border with papillae, which are greatly developed at the lateral sides of the segment. The ventral side of the anal segment is almost fully occupied by the base of the anal cirri. The regenerated anal segment has its surface beset with densely crowded papillae.

In the maxillary region the dorsal side of the proboscis bears two paragnathi on the median line (I), one large tooth in front succeeded by a smaller one, and on each side a small triangular patch (II) of 9 to 10 teeth is to be found; on the ventral side the median group (III) consists of a transverse patch of about 14 teeth and 2 or 3 teeth on each side, the lateral groups (IV) constitute a rather large semilunar patch of about 22 teeth. The basal region bears on the dorsal side a median triangular patch of 3 paragnathi (V), laterally a transverse ridge (VI) occurs, not very high, faintly notched in the middle; in one specimen the middle portion of the left ridge is wanting, this tooth was thus broken up in two. On the ventral side a belt of three rows of teeth occurs, those of the median series alternating with the others; in the median area two teeth are situated next each other.

This species is closely related to *N. taorica* Laugh. [1]), *N. Helleri* Gr. [2]) and *N. camiguina* Gr. [3]). *N. Helleri* however is distinguished by the length of its dorsal cirri, which are twice as long as the superior ligule. Our know-

1) Canarische Anneliden: Nova Acta der K. Leop.-Carol.-Deutschen Akad. Bd. XLII, p. 110, T. I, fig. 15.

2) Annulata Semperiana: Mém. de l'Acad. Imp. des Sciences de St. Pétersbourg. VIIe Sér. T. XXV, p. 81.

3) loc. cit. p. 87, pl. IV, fig. 8.

ledge of the characters of *N. taorica* is rather scanty, but this species seems to be characterized by having at the ventral side of the basal region of the proboscis only a single series of few paragnathi. Our species more nearly approaches *N. camiguina*, though the arrangement of its paragnathi is somewhat different, the structure of the feet is also somewhat doubtful, as we have no figure of them. Grube seems to have known only the atocous form, perhaps our specimens might be the epitocous form of this species.

Nereis nigro-punctata, n. sp. (Pl. 8, figs. 1—3).

Epitocous form. The body of the largest specimen measures 27 mm. in length; the number of its segments amounts to 70. Cephalic lobe trapezoidal, with the posterior margin truncated, not quite so long as broad; eyes large, situated next each other. Antennae having a third of the length of the head; palpi about twice as long as the antennae, their basal portion in the middle with an annular groove. The antero-posterior diameter of the buccal segment only slightly more than that of the succeeding ring; the inferior pair of the tentacular cirri about as long as the palpi, the longest of the superior pair reaching to the posterior border of the 4th segment or beyond. Segments in the anterior body-region on each side of the dorsum marked by a transverse blackish spot, posteriorly only with a dot of the same colour; head generally also marbled with blackish.

The change of the feet commences in the males at the 16th segment, in the females at the 19th ring. At the feet of the anterior body-region the lip of the dorsal setigerous lobe has a rounded border, divided by a deep notch in a small superior and a larger inferior half; the ventral lobe is shorter, reaching about to the middle of the inferior edge of the dorsal lobe. The superior ligule is bluntly triangular, nearly of the same length as the dorsal lobe; the inferior ligule projects till the tip of the ventral lobe. Dorsal cirrus almost twice as long as the superior ligule,

ventral cirrus of the same length as the inferior ligule. In the anterior feet the ventral and dorsal cirri greatly enlarged at their base. In the inferior fascicle of the ventral lobe sometimes a heterogomph setose bristle occurs. At the feet of the posterior body-region the lip of the dorsal lobe is conically produced, with a narrow oblong oval lamella at the base of the ventral border, the ventral lobe shows an obtuse, truncated anterior lip and a large lamellar posterior one. The superior ligule, about of the same length as the dorsal lobe, is provided at its dorsal side with a small rounded lamella in front of the base of the dorsal cirrus, and with a rather elongated lamella behind it; the inferior ligule, projecting as far as the ventral lobe, has a large conical process near its base. Dorsal cirrus much longer than the superior ligule, smooth in the females, with eight papillae at the ventral side of their distal end in the males; ventral cirrus a little longer than the inferior ligule, on the dorsal side with two narrow tongue-shaped lamellae, on the ventral side with an oblong lamella near its base. Both lobes have setose bristles with knife-shaped terminal pieces of ordinary appearance. Anal segment with longitudinal grooves; anal cirri reaching as far as the posterior 6 segments.

Paragnathi of proboscis: Maxillary region, I. group of 4 or more; II. semilunar group; IV. large group; III. a group consisting of a large, transverse median patch and 2 or 3 teeth on each side; basal region, V. triangular group of 3 teeth; VI. short, curved ridge; VII. and VIII. belt of two series of teeth, alternating with each other. — Malayan Archipelago.

In the same bottle, which contained *N. malayana*, I found more than hundred examples of this small, characteristically marked species. Its body-length is very different and varies from 27 to 12 mm.; nevertheless the small specimens are also in a state of sexual maturity and have about the same number of segments as the larger ones. The number of male and female specimens seems to be nearly equal.

Like in the preceding species the length of the tentacular cirri seems to be very variable; for usually the longest cirrus of the dorsal pair reaches to the 6th segment, however, in some individuals it extends only to the posterior border of the 4th ring, and in other ones it reaches the 9th segment. In the males the epitocous change of the feet commences at the 16th, in the females at the 19th ring; some segments, however, situated more in front, show already marks of this transformation, f. i. a small lamella at the base of the ventral cirrus at the 12th foot in a male. The dorsal and ventral cirri of the anterior feet have their basal portion greatly enlarged, in the males this is visible at the dorsal cirrus of the anterior 7 feet, but at the ventral cirrus of only 5 feet. The females show this character only at the dorsal and ventral cirri of the anterior 5 feet. The papillae occurring at the dorsal cirrus of the posterior segments in the males, disappear nearly at the 50th segment; posteriorly the dorsal cirri are smooth as in the females.

The maxillary region of the proboscis in most of the specimens has on the dorsal side a median (I) triangular group of 7 teeth; this number however decreases in some of them to 4, whereas in other individuals it increases to 9 or 11. Next to it on each side (II) there occurs a curved group of 15 to 20 teeth. On the ventral side the median group (III) consists of three patches, a large transverse one of about 20 teeth, arranged in 4 series, and a small group ones however are not always quite isolated from the median of 2 to 4 teeth at a short distance on each side; the latter group. Laterally a large group (IV) occurs, consisting of 25 to 30 teeth. The basal region bears on the dorsal side (V) a median triangular patch of 3 paragnathi; only in one of perhaps hundred specimens I observed 4 teeth in this group. Laterally (VI) a short, semilunar, ridge-shaped tooth occurs; only in one specimen I observed behind the ridge of the right side another small transverse tooth. However sometimes one of both ridges is broken up in two

teeth. On the ventral side (VII and VIII) a belt of two rows of teeth is to be found.

From the foregoing description, based on the examination of a great number of specimens, it may be concluded, that the arrangement of the paragnathi is very constant; the number of small teeth in the lateral groups varies within certain limits, but on the dorsal side the median maxillary group only appears to be liable to some variation, as is already stated by other authors.

Among the species of the *Perinereis*-division, characterized by having in group V. a triangular patch of three teeth, only a small number are described, which have in group I. more than 2 paragnathi; they are: *N. perspicillata* Gr. [1]), *N. Anderssoni* Kgb. [2]) and *N. exsul* Kgb. [3]). *N. perspicillata*, only known in atocous state, is distinguished from our species by the longitudinal series of paragnathi in group I, by the shortness of its palpi and by having the dorsal cirrus not longer than the superior ligule. Our knowledge of the characters of the two other species is too scanty.

Nereis ferox Hans. (Pl. 7, figs. 6—8). — Recherches sur les Annélides, recueillies par M. le Prof. E. van Beneden pendant son voyage au Brésil et à la Plata, loc. cit. p. 14, pl. IV, figs. 34—39.

Length of a specimen, with regenerated posterior region, 37 mm.; anterior region of the body considerably enlarged. Cephalic lobe longer than broad; its anterior part in front of the eyes narrower. The head measures a little more in length than the antero-posterior diameter of the two succeeding segments (the proboscis being extruded). Antennae two thirds of the length of the cephalic lobe; palpi large, about of the same length as the antennae. The antero-posterior diameter of the buccal segment once and a

1) Annulata Semperiana, p. 90, T. IV, fig. 10.
2) Annulata nova, p. 175.

half that of the following segment. Tentacular cirri short; the longest of the inferior pair about of the same length as the palpi, the longest of the superior pair projecting beyond the antennae, reversed they reach to the 5th segment. The feet of the anterior and posterior body-region show a different appearance. In the anterior feet, the lip of the dorsal setigerous lobe blunt, rounded; the lips of the ventral lobe only a little shorter, trapezoidal, with a slight notch. Superior ligule of the same shape and length as the dorsal lobe; inferior ligule a little shorter, obtusely conical. The dorsal cirrus arises from a shallow notch of the superior ligule and is very long, projecting far beyond the tip of the dorsal lobe; the ventral cirrus only a little longer than the inferior ligule. In the posterior segments the superior ligule is considerably enlarged and consists of a broad lamella with a straight external margin and a convex internal one; it bears on its tip the dorsal cirrus, which has only half its length. The dorsal lobe does not reach further than one fourth of the length of the ligule; the inferior ligule has undergone no change and has about the same length as the ventral cirrus. In the dorsal lobe only homogomph setose bristles; the ventral lobe contains: in the superior fascicle heterogomph falcate bristles and homogomph setose ones, in the inferior fascicle, besides the heterogomph falcate bristles, a couple of heterogomph setose bristles, at least in the posterior segments.

Paragnathi of the proboscis: Maxillary region, I. one or two teeth; II. small group of 3 or 4 curved rows; IV. large group of 4 to 5 transverse series, and a semilunar patch in front of them; III. group of 3 or 4 transverse rows; basal region, V. one conical tooth; VI. transverse ridge; VII. and VIII. a belt of two series of teeth.

The bottle contained only one complete specimen, besides some fragmentary examples, among which two anterior body-regions with proboscis. The worms are decolored, only the dorsum is partly brownish and marked with white transverse bands on the anterior margin of each ring. The

head is blackish, with a longitudinal white band in the median line, broad between the eyes and narrowing anteriorly. The superior ligules, especially in the posterior body-region, show a greyish hue. The tentacular cirri of the different examples vary somewhat in length; however in all of them the posterior of the right dorsal pair is the longest. The feet do not present the same appearance over the total length of the body, as stated by Hansen; on the contrary the superior ligule, in the anterior segments only a little larger than the dorsal lobe, increases gradually in the posterior body-region, and near the anal extremity surpasses in size the total foot. However the dorsal cirrus decreases gradually in length in the posterior region.

The setose bristles are short and slender, of a vitreous appearance: those of the dorsal lobe do not project beyond the tip of the falcate bristles of the ventral lobe. However the falcate bristles are very stout, brownish; their terminal pieces are not »sans denticules" as stated by Hansen, but beset with fine setae along the base of the concave margin. Only in the posterior body-region the ventral lobe seems to contain, besides the falcate bristles, one or two heterogomph setose ones. Hansen's drawing of the proboscis of this species is rather correct. The paragnathi show the characteristic appearance, by which, according to Kinberg's description, his genus *Paranereis* should be distinguished; they consist for the greater part of pin-shaped teeth with darkbrown tip (papillae pectiniformes). Group I. consists of a single conical tooth, though in one specimen I observed another smaller one situated more posteriorly; in group II. there occurs a small patch of 3 to 4 succeeding transverse rows of pin-shaped paragnathi, of which the external row is the longest, group IV. consists of a large patch of 4 or 5 transverse rows of pin-shaped teeth, of which the external row is the longest and extends somewhat beyond the penultimate of them; between these and the maxillae another semilunar group of large conical

teeth is situated; group III. consists of 4 transverse series which are faintly curved in a knee-like manner, and of which the inferior one is the longest. The basal region has in group V. one bluntly conical tooth and in group VI. a transverse triangular ridge, whereas group VII. and VIII. show two series of teeth, alternating with each other; the posterior series consists of longitudinal, narrow teeth (»dentes compressae" Kinberg), the anterior series of stout conical ones.

Two specimens, described by Hansen under the name of *N. obscura* [1]), also belong to this species; the largest of them has the anal region complete, with two long anal cirri, extending about over the posterior 9 segments. The superior ligule of the feet preserves his great elongation till at the fifth segment in front of the anal end, posteriorly it decreases gradually in size.

Another specimen, labelled *N. coerulea* Hans. [2]), ought to be ranged also under this species; though it wants the anterior body-region, the structure of its posterior feet is characteristic enough to recognize the species at once. The drawing of one of the anterior feet (Pl. IV, fig. 1) rather well resembles our fig. 6. Hansen's statement, that the terminal pieces of the falcate bristles are devoid of setae, is not correct.

Another specimen, labelled *N. microphthalma* [3]), must also be identified with this species; on comparing Hansen's drawing of a foot on Pl. IV, fig. 26, with his figure 1, I cannot find out much difference. The specimen has the dorsum of the anterior body-region reddish coloured; the head shows the ordinary white longitudinal band, and each segment is marked on the lateral sides of the dorsum with some white oblique lines, extending from the posterior margin of the segments to the middle. In examining the proboscis, I found in group I. three paragnathi,

1) loc. cit. p. 13, pl. IV, figs. 18—24.
2) loc. cit. p. 11, pl. III, fig. 31, and pl. IV, figs. 1—3.
3) loc. cit. p. 13, pl. IV, figs. 25—28.

besides the two ordinary teeth another small one; this confirms the observations about the variability of the number of paragnathi of this group.

This species is closely allied to *N variegata* Gr. [1]), perhaps identical with this species from the West-coast of South America (Callao and Valparaiso); as the description of this worm is not accompanied by figures, the question remains somewhat doubtful. However in his paper »die Familie der Lycoriden" published afterwards, Grube gives more detailed communications about the arrangement of the paragnathi and states that the species shows all the striking characters of Kinberg's genus *Paranereis*. *N. ferox* resembles *N. variegata* [2]) as well in the colour and the dimensions of the cephalic lobe, as in the length of the tentacular cirri and the structure of the feet. Kinberg's *N. elegans* seems to be distinguished by the shape of its head »lobus cephalicus elongatus, segmenta 5 proxima aequans."

? ***Nereis Stimpsonis*** Gr. [nec *N. variegata* Gr.] (Pl. 7, figs. 9—11). — Reise der Oesterr. Fregatte Novara, Zoolog. Theil, Bd. II, Anneliden, p. 18, T. I, fig. 8.

In our collections there are two large *Nereis*-specimens, collected by Mr. Horstock at the Cape of Good Hope, which I believe must be identified with Grube's *N. Stimpsonis*. However some confusion seems to reign in the description of the characters of this species. For Grube's description is established on two specimens: a large one collected near the Cape during the Cruise of the Novara, and another example of the Hamburg Museum probably from the same locality; because this latest specimen much agreed with *N. variegata* (really belonged to that species, as I believe), therefore Grube concluded that his *N. Stimpsonis* should be considered to be a variety of *N. variegata*.

1) Annulata Oerstediana, Naturh. Foren. Vidensk. Meddedelser, 1857, p. 7.

2) About Grube's identification of *N. variegata* and *N. Stimpsonis* see further on.

Though it is very difficult to settle this question without examining the type-specimens, it appears to me that Grube's description probably is based on two different species; otherwise I cannot clear up the controversies in his descriptions. In *N. Stimpsonis* the cephalic lobe should have the same length as the buccal segment, in *N. variegata* on the contrary it should be a little longer than the two following segments. In his paper »die Familie der Lycoriden", on p. 16, Grube mentions *N. Stimpsonis* and *N. variegata* as two different species, and in speaking of the structure of the paragnathi (»papillae compressae" and »papillae pectiniformes"), he only refers to *N. variegata*, not to *N. Stimpsonis*.

Therefore I believe it will be not without interest to give a detailed description of our specimens.

The largest individual is a female, in state of sexual maturity; it measures 125 mm. in length and 11 mm. in breadth at its widest part (with the feet). The number of its segments amounts to 91.

The cephalic lobe is a little longer than the antero-posterior diameter of the buccal segment. The antennae are short, scarcely half as long as the head, extending till the first articulation of the palpi. The tentacular cirri are not long, not projecting beyond the tip of the antennae, and reversed they reach till on the middle of the 2nd segment. The antero-posterior diameter of the buccal segment one third longer than that of the following ring. The feet of the anterior and the posterior body-region considerably different in structure. In the anterior segments the dorsal setigerous lobe short, rounded, papilliform, the ventral lobe shorter, trapezoidal. The superior ligule of the same shape and size as the dorsal lobe, the inferior ligule a little shorter than the ventral lobe, obtusely conical. The dorsal cirrus blunt and stout, projecting far beyond the tip of the dorsal lobe, about twice the length of the superior ligule; the ventral cirrus on the contrary much shorter than the ventral lobe. In the posterior segments the superior

ligule is greatly enlarged, and consists of an elongated lamella; the inferior ligule is obtusely conical, longer than the ventral lobe, about of the same dimension as the dorsal one. The dorsal cirrus, arising from a shallow notch of the ligule, measures a little more than one third of its length. The ventral cirrus is much shorter than the inferior ligule.

The paragnathi consist only of blunt, conical teeth. The maxillary region of the proboscis has in group I. one tooth; II. is a narrow semilunar patch; IV. is a larger group of about 5 transverse rows; III. a transverse patch of 3 rows; basal region, group V. one conical tooth; VI. a large, oval, transverse ridge; VII. and VIII. an irregular belt of four series, uniting into a single one at the dorsal side, the anterior teeth of the belt are the largest. In regard to this character our specimens differ from Grube's *N. Stimpsonis*, which has a belt of only two series. In Grube's drawing of the proboscis (fig. 8, a) the groups V. and VI. seem to consist of minute teeth; however this must be a mistake of the artist, for Grube states exactly: »annulus posterior supra granis 3 maximis valde distentis, triangulum valde obtusangulum vel lineam componentibus". Moreover in his paper »die Familie der Lycoriden", p. 16, he observes, that his *N. Stimpsonis* belongs to the sub-genus *Perinereis*. Ehlers seems to have overlooked this, for in his systematical table *N. Stimpsonis* is erroneously ranged in the group characterized »Kieferspitzen vollständig, nur kegelförmige".

Nereis minor Hans. (Pl. 8, figs. 8—10). — loc. cit. p. 12, pl. IV, figs. 8—12.

Epitocous form. Length of the body 40 mm. (according to Hansen), its breadth 4 mm. Cephalic lobe longer than the antero-posterior diameter of the three following segments. Antennae short, of about half the length of the head, extending till the first articulation of the palpi; antero-posterior diameter of the buccal segment scarcely longer than that of the following ring. Tentacular

cirri short, the longest of the ventral pair not so long as the palpi; the longest of the dorsal pair longer than the palpi, reversed they reach to the 4th segment. In the anterior feet the lip of the dorsal setigerous lobe short, rounded; lips of the ventral lobe somewhat shorter, trapezoidal. Superior ligule conical, larger and a little longer than the dorsal lobe, inferior ligule less developed and not projecting beyond the tip of the ventral lobe. Dorsal cirrus long and slender, extending far beyond the tip of the superior ligule, ventral cirrus short, somewhat longer than the half of the inferior ligule. In the posterior segments the superior ligule is enlarged and presents a more acute shape; the lip of the dorsal lobe is more conical, about of the same appearance as the inferior ligule. The ventral lobe presents a narrow lamella. The ventral cirrus, about of the same length as the inferior ligule, bears near its base on the dorsal side two obtuse, tongue-shaped lamellae, on the ventral side a narrow rounded lamella. The inferior fascicle of the ventral lobe contains, besides the heterogomph falcate bristles, a single heterogomph setose one.

Paragnathi of the proboscis: Maxillary region, I. two teeth situated behind each other; II. small, semilunar group; IV. large curved patch; III. transverse group; basal region, V. triangular group of 3 teeth; VI. a transverse, round ridge; VII. and VIII. a belt of two rows of conical teeth, alternating with each other; on the ventral side the rows are separated from each other, on the dorsal side they unite in a single series.

The bottle contained only a single incomplete specimen, wanting the posterior body-region. It is a female with completely developed eggs, presenting however only faint marks of epitocous transformation. The eyes are not enlarged; the feet of the posterior segments present but some faint lamellar processes, and bristles with knife-shaped terminal pieces could not be observed.

Already several species of the *Perinereis*-group are known, which have in group V. of the proboscis a triangular

patch of three paragnathi; among them *N. Anderssoni* belongs, found in the same locality as our specimens (Rio de Janeiro). That species seems to be distinguished from *N. minor*, by having in group I. of the proboscis not 2, but 4 paragnathi, however because the number of paragnathi in group I. is liable to some variation in the same species, perhaps both species may prove to be identical.

In the following table I have tried to enumerate all the known species of *Nereis*, which belong to the *Perinereis*-group; the literature on Annelida being however so extensive and dispersed in so many periodicals, which are often very difficult to be get, one or another species may have been overlooked. Nevertheless I hope, that my colleagues, dealing with this matter, will not find it quite useless.

Perinereis.

A. Transverse and conical paragnathi in group VI.

Marionii Aud. et Edw. Annales des Sciences naturelles, T. XXIX, 1833, p. 207, pl. XIII, fig. 1—6; Grube, Anneliden des Pariser Museums, Archiv für Naturgeschichte, Jahrg. XXXVI, Bd. 2, p. 304. . . . . [Coast of French (St. Malo, Vendée).

mictodonta Marenzeller [1]), Südjapanische Anneliden, Denkschriften der Math.-Naturw. Classe der Kaiserl. Akademie, Bd. XLI, p. 10, T. II, fig. 2. . . . Japan.

B. Two transverse paragnathi in group VI.

a. A triangular patch of 3 paragnathi in group V.

vancaurica Ehl. (*languida* Gr.) Grube, Annulata Semperiana, Mémoires de l'Acad. Imp. des Sciences de St. Pétersbourg, VIIe Sér. T. XXV, p. 83; Ehlers, die Borstenwürmer, p. XX. . Nancauri (Nicobar I.).

1) I do not understand Marenzeller's assertion, that this species could not be ranged in Kinberg's family of the Aretidea; *N. mictodonta* appears to me to belong to this family as well as *N. Marionii*, which both correspond with each other in having a series of paragnathi in group VI, partially consisting of transverse ridges.

aibuhitensis Gr. Annulata Semperiana, p. 89, T. V. fig. 3. . . . . Philippines.

b. A single paragnathe in group V.

singaporiensis Gr. Annulata Semperiana, p. 84 . . [Singapore.

C. A single transverse paragnathe in group VI.

a. A patch of 5 or more paragnathi in group V.

macropus Clap. Annélides Chétopodes du Golfe de Naples. Supplément, p. 444, pl. VIII, fig. 1. . Napels.

novae hollandiae Kinb. Annulata nova, Oefversigt af K. Vet. Akad. Förhandlingar, 1865, p. 175. . . [Port Jackson.

b. A triangular patch of 3 paragnathi in group V.

cultrifera Gr. Ehlers, Borstenwürmer, p. 461, pl. XXI, figs. 31—36. — Claparède, Annélides Chétopodes du Golfe de Naples. Supplément, p. 439, pl. VII, fig. 1. [Coast of Europe.

taorica Lgh. Canarische Anneliden, Nova Acta der K. Leop.-Carol. Deutschen Akad. der Naturforscher, Bd. XLII, 1881, p. 110. . . . . Tenerif.

perspicillata Gr. Annulata Semperiana, p. 90, T. IV, fig. 10. . . . . Philippines.

camiguina Gr. (? *aberrans* Kinb.) Annulata Semperiana, p. 87, T. IV, fig. 8 . . . . . Philippines.

Helleri Gr. [1]) Annulata Semperiana, p. 81. Philippines.

malayana, n. sp. . . . . Malayan Archipelago.

nigro-punctata, n. sp. . . . Malayan Archipelago.

Anderssoni Kinb. Annulata nova, p. 175. Rio de Janeiro.

1) In his analytical table of the *Perinereis*-species (Annulata Semperiana p. 60) Grube places *N. Helleri* in the group B. b, characterized by „nur 1 Paragnath in der 5ten Gruppe"; this must be a mistake, for we read in the detailed description of *N. Helleri*, on p. 82, „paragnathi ordinis 5ti triangulum componentes" and farther on „von *Perinereis*-Arten, die in der 6ten Gruppe nur 1 queren, in der 5ten Gruppe 3 und in der 1sten nur 2 Paragnathen haben, ist bisher nur eine, nämlich *P. aberrans* Kbg., bekannt, vielleicht sogar mit unserer Art zu identificiren" etc.

Hedenborgi Kinb. Annulata nova, p. 175. Alexandria.
exsul Kinb. Annulata nova, p. 175. . . . ?
minor Hans. Mém. couronnés et Mém. des Savants étrangers de l'Acad. Royale de Bruxelles, T. XLIV, 1882, p. 12, pl. IV, figs. 8—12. Rio de Janeiro.

c. A single paragnathe in group V.

α. One or two paragnathi in group I.

floridana Ehl. Borstenwürmer, p. 503; Zeitschrift für Wissensch. Zoologie, Bd. XXXIII, 1880, p. 289, T. XV, fig. 24. . . . . Florida, Madeira.
atlantica M'Int. [1]) Challenger-Reports, Zoology, XII, p. 219, pl. XXXV, figs. 1—3; pl. XVI A, figs. 10 and 11 . . . . . Cape Verde Islands.
Oliveirae, n. sp. . . . . Coast of Portugal.
Stimpsonis Gr. Reise Oesterr. Freg. Novara, Zool. Theil, Bd. II, 1867, p. 18, T. 1, fig. 8. . . . Cape.
variegata Gr. Annulata Oerstediana, Naturh. Foren. Vidensk. Meddedelser, 1857, p. 7. Callao, Valparaiso.
ferox Hans. (*obscura* Hans., *coerulea* Hans., *microphthalma* Hans.) Mém. couronnés et Mém. des Savants étrangers de l'Acad. Royale de Bruxelles, T. XLIV, 1882, p. 14, Pl. IV, figs. 34—39 . . . Rio de Janeiro.

β. A patch of 3 or more paragnathi in group I.

1. Dorsal lobe of the feet posteriorly greatly enlarged.

melanocephala M'Int. Challenger-Reports, Zoology, XII, p. 216, pl. XXXIV, figs. 14—17; pl. XVI A, figs. 8 and 9. . . . . Bermuda.

1) According to M'Intosh' description the proboscis of *N. atlantica* should have in group V. two narrow horny ridges, and behind one a small posterior tooth (in extrusion), and in VI. the tooth should be absent; however as we know no species of *Nereis*, having transverse teeth in group V, I suppose an error must have crept into this description, due to the difficulty of recognizing the exact arrangement of the paragnathi, when the proboscis is not in state of extrusion. Therefore I believe that in *N. atlantica* the two horny ridges are situated in group VI. and the small tooth in V, as in other species of *Perinereis*; should this not be the case, the species could not at all belong to Kinberg's *Perinereis*, as supposed by M'Intosh.

2. Dorsal lobe of the feet posteriorly not greatly enlarged.
striolata Gr. Annulata Semperiana, p. 85, T. IV, fig. 9 . . . . . Philippines.
obfuscata Gr. Annulata Semperiana, p. 86. Philippines.
Ponteni Kinb. Annulata nova, p. 176. Rio de Janeiro.

d. No paragnathi in group V.
capensis Kinb. Annulata nova, p. 174. . . . Cape.

In this list are not enumerated, though belonging in the *Perinereis*-group, the following unsufficiently described species: *Pseudonereis gallapagensis* Kinb. (Annulata nova, p. 174), Gallapagos; *Pseudonereis formosa* Kinb. (loc. cit. p. 174), Honolulu; *Paranereis elegans* Kinb. (loc. cit. p. 175), Valparaiso.

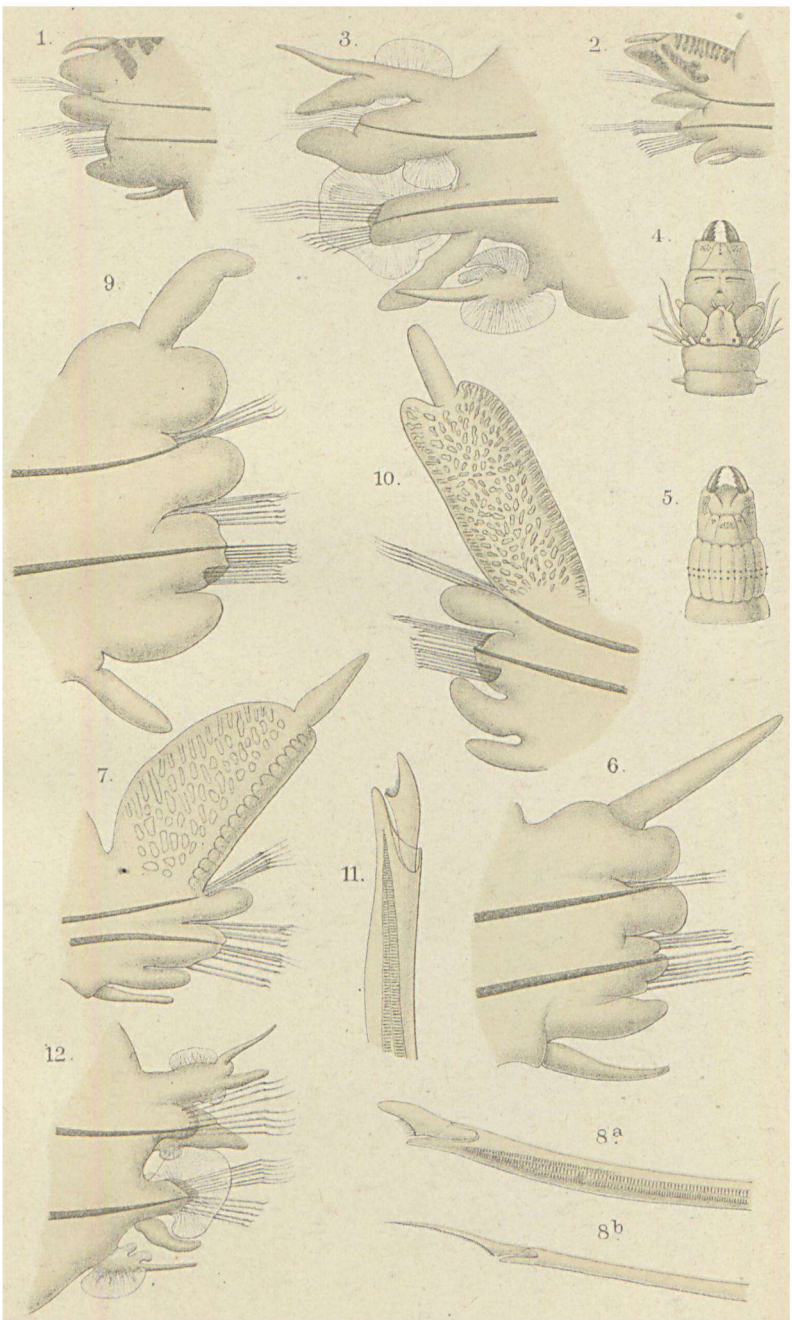
EXPLANATION OF THE PLATES.

Plate 7.

Fig. 1. Sixteenth foot of *Nereis Oliveirae* Horst, atocous form. × 15 diam.
» 2. Ninetieth foot of the same. × 15 diam.
» 3. Fifty-fourth foot of the same species, epitocous form (♀). × 15 diam.
» 4. Dorsal side of the anterior region of the same, with proboscis extruded. × 4 diam.
» 5. Ventral side of the proboscis of the same. × 4 diam.
» 6. Eighth foot of *Nereis ferox* Hans. × 28 diam.
» 7. Sixtieth foot of the same. × 28 diam.
» 8. *a.* Falcate bristle; *b.* heterogomph setose bristle of the same. × 175 diam.
» 9. Eighth foot of ?*Nereis Stimpsonis* Gr. × 15 diam.
» 10. Sixtieth foot of the same. × 15 diam.
» 11. Falcate bristle of the same. × 175 diam.
» 12. Forty-second foot of *Nereis macropus* Clap., epitocous form. × 15 diam.

Plate 8.

Fig. 1. *Nereis nigro-punctata* Horst, epitocous form, with proboscis extruded, from the dorsal side. × 2 diam.
» 2. Twelfth foot of the same (♂). × 15 diam.
» 3. Thirty-eighth foot of the same (♂). × 15 diam.
» 4. Twelfth foot of *Nereis malayana* Horst, epitocous form (♀). × 15 diam.
» 5. Fifty-second foot of the same (♂). × 28 diam.
» 6. Hundred-thirty-fifth foot of the same (♀). × 28 diam.
» 7. Anal region of the same (♀). × 15 diam.
» 8. Ninth foot of *Nereis minor* Hans. × 28 diam.
» 9. Forty-fifth foot of the same. × 28 diam.
» 10. Falcate bristle of the same. × 175 diam.



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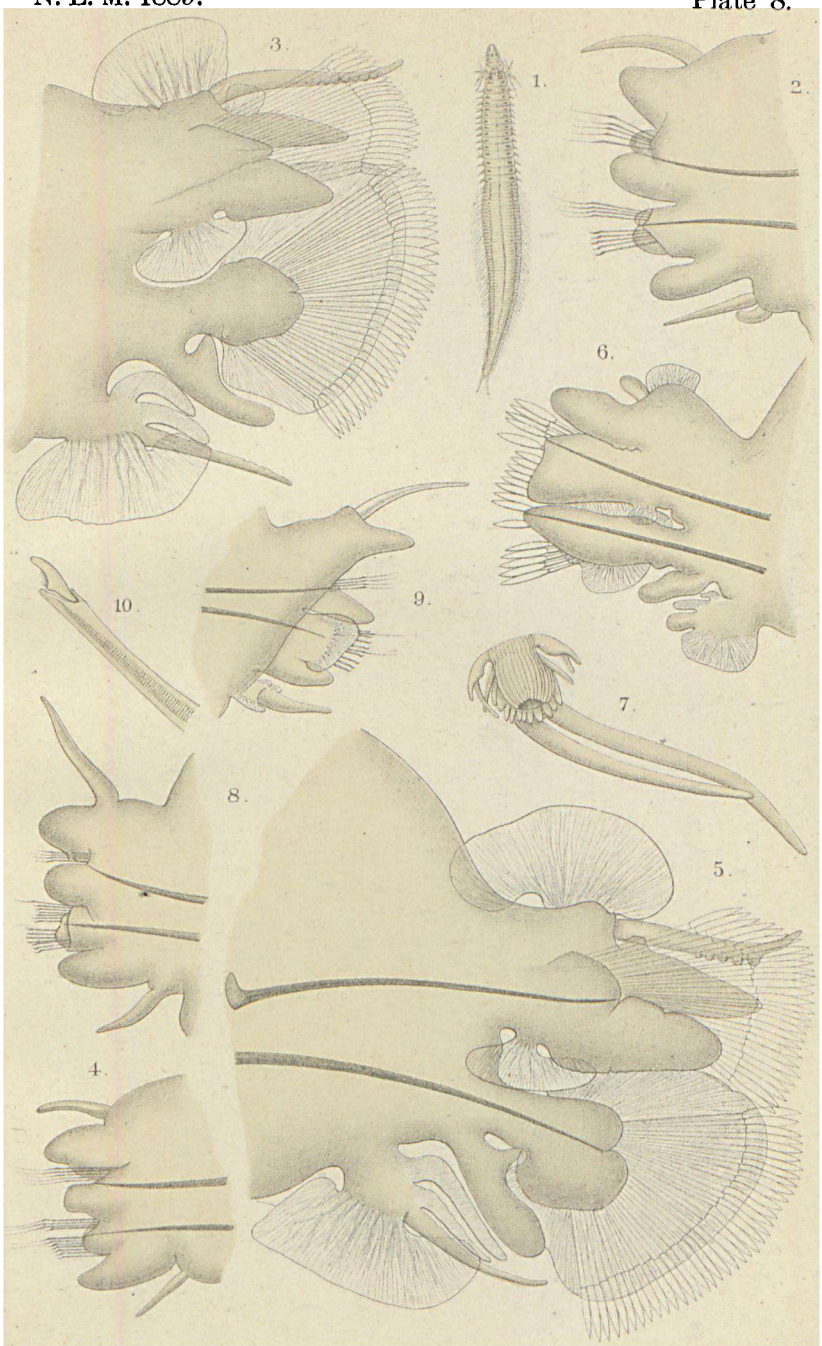
1—5. Nereis Oliveirae *Horst.* 9—11. Nereis Stimpsonis *Gr.*
6—8. „ ferox *Hans.* 12. „ macropus *Clprd.*



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1—3. Nereis nigro-punctata *Horst.* 4—7. Nereis malayana *Horst.* 8—10. Nereis minor *Hans.*